UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/736,991	12/17/2003	Arthur H. Laflamme JR.	071469-0306511 (PC6025A)	6448

69792 7590 06/14/2007

TOKYO ELECTRON U.S. HOLDINGS, INC.
4350 W. CHANDLER BLVD.
SUITE 10
CHANDLER, AZ 85226

EXAMINER	
MOORE, KARLA A	

ART UNIT	PAPER NUMBER
1763	

MAIL DATE	DELIVERY MODE
06/14/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/736,991	LAFLAMME ET AL.	
	Examiner	Art Unit	
	Karla Moore	1763	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03 April 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-34,36-41,43 and 44* is/are pending in the application.

4a) Of the above claim(s) *4-6,8,10-12,14-16,18,21,23-26,29,32-34,39- 41,44* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3,7,9,13,17,19,20,22,27,28,30,31,36-38 and 43* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *17 December 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-2, 7, 9, 17, 19-20, 22 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Okase (US 6,228,173) in view of Lingampalli (US 6,632,325) and Imafuku (US 2004/0083970 A1).

With respect to Claim 1: Okase discloses a reduced maintenance processing system for treating a substrate comprising: a chemical treatment system for chemically altering exposed surface layers (Fig. 1 Item 182) on the substrate comprising a temperature controlled chemical treatment chamber (Fig. 1 Item 162); a thermal treatment system for thermally treating the chemically altered surface layers on the substrate (Fig.2 Item 22), the thermal treatment system comprising a temperature controlled thermal treatment chamber (Fig. 2 Item 44) having a protective barrier formed on at least a portion of an interior surface (Fig. 2 Item 68, Column 6 Lines 52-54); and a thermal insulation assembly coupled to the thermal treatment system and the chemical treatment system (Fig. 1 Item 3). The protective barrier on the interior surface of the chemical treatment chamber comprises at least one of Al_2O_3, Y_2O_3, Sc_2O_3, Sc_2F_3, YF_3, La_2O_3, CeO_2, Eu_2O_3, and DyO_3 (Paragraph 80 Lines 1-4). Anodized aluminum is

composed mostly of Al_2O_3, see definition of anodizing in the online encyclopedia Wikipedia third paragraph.

Okase does not expressly disclose the chemical treatment and thermal treatment chambers have a protective barrier formed on at least a portion of an interior surface (Column 5 Lines 31-42).

Lingampalli discloses a chemical and thermal treatment chamber with a protective barrier formed on at least a portion of the interior surface. Okase and Lingampalli are analogous art because they are from the same field of endeavor, namely semiconductor processing apparatus.

At the time of invention, it would have been obvious to a person of ordinary skill in the art to form Okase's apparatus including a chemical treatment and thermal treatment chamber having a protective barrier formed on at least a portion of an interior surface in view of the teaching of Lingampalli. The suggestion or motivation for doing so would have been to provide a chemical and thermal treatment chamber with internal protective coating (Column 5 Lines 31-42). Therefore, it would have been obvious to combine Okase with Lingampalli for the benefit of a chemical treatment and thermal treatment chamber having a protective barrier formed on at least a portion of an interior surface to obtain the invention specified in Claim 1.

Okase in view of Lingampalli does not expressly state the thermal insulation assembly comprises a protective barrier layer comprising one of Al_2O_3, Y_2O_3, Sc_2O_3, Sc_2F_3, YF_3, La_2O_3, CeO_2, Eu_2O_3, and DyO_3 on at least one exposed surface.

Imafuku teaches the thermal insulation assembly comprises a protective barrier on at least one exposed surface for the purpose of preventing damage attributable to plasma on exposed surfaces and the extent of metal contamination and dust generation is lowered (Abstract and Paragraph 27, Lines 1-6). Okase, Lingampalli, and Imafuku are analogous art because they are from the same field of endeavor, namely semiconductor processing apparatus.

Although Imafuku does not disclose the provision of a protective barrier layer on all of the surfaces of the apparatus exposed to plasma, it would have been obvious to one of ordinary skill in the art to do so with expectation of achieving the same results described in Imafuku.

At the time of invention, it would have been obvious to a person of ordinary skill in the art to form the apparatus of Okase in view of Lingampalli including a thermal insulation assembly comprises a protective barrier on at least one exposed surface. The suggestion or motivation for doing so would have been to provide a stable condition maintainable even when it is exposed to plasma and to prevent damage attributable to plasma on exposed surfaces and to lower the extent of metal contamination and dust generation (Abstract and Paragraph 27, Lines 6-7). Therefore, it would have been obvious to combine Okase in view of Lingampalli with Imafuku for the benefit of having a thermal insulation assembly comprising a protective barrier on at least one exposed surface to obtain the invention specified in Claim 2.

With respect to Claim 7: Lingampalli discloses a processing system, wherein the protective barrier on the Interior surface of the chemical treatment chamber comprises at least one of Al_2O_3, Y_2O_3, Sc_2O_3, Sc_2F_3, YF_3, La_2O_3, CeO_2, Eu_2O_3, and DyO_3 (Column 5 Lines 31-42).

With respect to Claim 9: Okase discloses a processing system as claimed in claim 1, wherein the chemical treatment system further comprises a temperature controlled substrate holder (Fig. 2 Item 44) making a protective barrier formed on at least a portion thereof (Fig. 2 Item 68), the protective barrier on the temperature controlled substrate holder mounted within the chemical treatment chamber comprising at least one of Al_2O_3, Y_2O_3, Sc_2O_3, Sc_2F_3, YF_3, La_2O_3, CeO_2, Eu_2O_3, and DyO_3 (Column 6 Lines 51-54).

With respect to Claim 17: Lingampalli discloses a processing system, wherein the protective barrier on the interior surface of temperature controlled thermal treatment chamber comprises at least one of Al_2O_3, Y_2O_3, Sc_2O_3, Sc_2F_3, YF_3, La_2O_3, CeO_2, Eu_2O_3, and DyO_3 (Column 5 Lines 31-42).

With respect to Claim 19: Okase discloses a processing system wherein the thermal treatment system further comprises a temperature controlled substrate holder mounted within the thermal treatment chamber (Fig. 2 Item 44) and having a protective barrier formed on at least a portion of an exposed surface (Fig. 2 Item 68), the protective barrier on the exposed surface of the temperature controlled substrate holder mounted within the temperature controlled thermal treatment chamber comprises at

least one of Al_2O_3, Y_2O_3, Sc_2O_3, Sc_2F_3, YF_3, La_2O_3, CeO_2, Eu_2O_3, and DyO_3 (Column 6 Lines 51-54).

With respect to Claim 20: Imafuku discloses a processing system, wherein the thermal insulation assembly comprises a gate valve assembly, wherein a protective barrier is formed on at least a portion of an exposed surface of the gate valve assembly (Fig. 2 Items 200 and 300).

With respect to Claim 22: Imafuku discloses a processing system, wherein the protective barrier on the exposed surface of the gate valve assembly comprises at least one of Al_2O_3, Y_2O_3, Sc_2O_3, Sc_2F_3, YF_3, La_2O_3, CeO_2, Eu_2O_3, and DyO_3 (Paragraph 27 Lines 1-6).

With respect to Claim 27: Okase discloses a processing system, wherein the thermal treatment system further comprises a substrate lifter assembly coupled to the thermal treatment chamber for vertically translating the substrate between a transfer plane and the substrate holder (Fig. 2 Item 62).

Claims 3 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Okase, Lingampalli and Imafuku as applied to claims 1-2, 7, 9, 17, 19-20, 22 and 27 above, and further in view of Carducci (US 2003/0037880 A1).

With respect to Claim 3: Okase discloses a processing system, wherein the chemical treatment system further comprises a temperature controlled substrate holder mounted within the chemical treatment chamber (Fig. 14 Item 162) and having a protective barrier formed on at least a portion of an exposed surface (Fig. 14 Item 134,

Column 12 Lines 59-60), a vacuum pumping system coupled to the chemical treatment chamber (Fig. 14 Item 179), the thermal treatment system further comprises a temperature controlled substrate holder mounted within the thermal treatment chamber (Fig. 2 Item 44) and having a protective barrier formed on at least a portion of an exposed surface (Fig. 2 Item 68), and a vacuum pumping system coupled to the thermal treatment chamber (Fig. 2 Item 32).

Lingampalli discloses a gas distribution plate comprising a plurality of gas injection orifices and having a protective barrier formed on at least a portion of an exposed surface of the gas distribution plate and at least a portion of an exposed surface of each orifice (Fig. 1 Item 118, Column 5 Lines 38-42).

However, Okase in view of Lingampalli does not expressly state the gas distribution plate is coupled to a temperature controlled gas distribution system for introducing a process gas into the chemical treatment chamber; and the processing system further comprises a control system coupled to the chemical treatment system and the thermal treatment system, and configured to control at least one of a chemical treatment chamber temperature, a chemical treatment gas distribution system temperature, a chemical treatment substrate holder temperature, a chemical treatment substrate temperature, a chemical treatment processing pressure, a chemical treatment gas flow rate, a thermal treatment chamber temperature, a thermal treatment substrate holder temperature, a thermal treatment substrate temperature, a thermal treatment processing pressure, and a thermal treatment gas flow rate.

Carducci teaches the gas distribution plate is coupled to a temperature controlled gas distribution system for introducing a process gas into the chemical treatment chamber (Fig. 1 Item 140); and the processing system further comprises a control system coupled to the chemical treatment system and the thermal treatment system, and configured to control at least one of a chemical treatment chamber temperature, a chemical treatment gas distribution system temperature, a chemical treatment substrate holder temperature, a chemical treatment substrate temperature, a chemical treatment processing pressure, a chemical treatment gas flow rate, a thermal treatment chamber temperature, a thermal treatment substrate holder temperature, a thermal treatment substrate temperature, a thermal treatment processing pressure, and a thermal treatment gas flow rate (Fig. 1 Item 140). Okase, Lingampalli and Carducci are analogous art because they are from the same field of endeavor, namely semiconductor processing apparatus.

At the time of invention, it would have been obvious to a person of ordinary skill in the art to form the apparatus of Okase in view of Lingampalli including the gas distribution plate is coupled to a temperature controlled gas distribution system for introducing a process gas into the chemical treatment chamber; and the processing system further comprises a control system coupled to the chemical treatment system and the thermal treatment system, and configured to control at least one of a chemical treatment chamber temperature, a chemical treatment gas distribution system temperature, a chemical treatment substrate holder temperature, a chemical treatment substrate temperature, a chemical treatment processing pressure, a chemical treatment

gas flow rate, a thermal treatment chamber temperature, a thermal treatment substrate holder temperature, a thermal treatment substrate temperature, a thermal treatment processing pressure, and a thermal treatment gas flow rate in view of the teaching of Carducci. Therefore, it would have been obvious to combine Okase in view of Lingampalli with Carducci to obtain the invention specified in Claim 3.

With respect to Claim 13: Carducci teaches a processing system, wherein the chemical treatment system further comprises a gas distribution plate comprising a plurality of gas injection orifices (Fig. 1 Item 350) and having a protective barrier formed on at least a portion of an exposed surface of the gas distribution plate (Paragraph 91 Lines 2-4) and at least a portion of an exposed surface of each orifice (Paragraph 99 Lines 8-12), wherein the gas distribution plate is coupled to a temperature controlled gas distribution system for introducing a process gas into the chemical treatment chamber (Fig. 1 Item 140).

Claims 28 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable Okase, Lingampalli and Imafuku as applied to claims 1-2, 7, 9, 17, 19-20, 22 and 27 above, and further in view of Perlov (US 2002/0170672 A1).

With respect to Claim 28: Okase, Lingampalli and Imafuku disclose a processing system substantially as claimed and as described above.

However, Okase, Lingampalli and Imafuku do not expressly state the substrate lifter assembly comprises a blade having three or more tabs for receiving the substrate and having a protective barrier formed on at least a portion of an exposed surface, and

a drive system for vertically translating the substrate between the substrate holder and a transfer plane.

Perlov teaches the substrate lifter assembly comprises a blade having three or more tabs (Fig. 1 Items 25a-c) for receiving the substrate and having a protective barrier formed on at least a portion of an exposed surface (Paragraph 27 Lines 1-4), and a drive system for vertically translating the substrate between the substrate holder and a transfer plane (Fig 2 Item 24). Okase, Lingampalli and Perlov are analogous art because they are from the same field of endeavor, namely semiconductor processing apparatus.

At the time of invention, it would have been obvious to a person of ordinary skill in the art to form the apparatus disclosed in Okase, Lingampalli and Imafuku including the substrate lifter assembly comprises a blade having three or more tabs for receiving the substrate and having a protective barrier formed on at least a portion of an exposed surface, and a drive system for vertically translating the substrate between the substrate holder and a transfer plane in view of the teaching of Perlov. The suggestion or motivation for doing so would have been to provide a lift that does not produce particles or scratch a substrate during contact (Paragraph 27 Lines 1-5). Therefore, it would have been obvious to combine Okase in view of Lingampalli with Perlov to obtain the invention specified in Claim 28.

It is also noted that Perlov teaches a processing system, wherein a protective barrier is formed on exposed surfaces (Paragraph 27 Lines 1-5).

Claims 31, 36-38 and 43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Carducci (US 2003/0037880 A1) in view of Imafuku (US 2004/0083970 A1).

With respect to Claim 31: Carducci discloses a chemical treatment system for chemically altering exposed surface layer on the substrate substantially as claimed and comprising: a temperature controlled chemical treatment chamber having a protective barrier formed on at least a portion of an interior surface (Paragraph 80 Lines 1-4); a temperature controlled substrate holder mounted within the chemical treatment chamber (Fig. 1 Item 112); a vacuum pumping system coupled to me chemical treatment chamber (Fig. 1 Item 109), and a gas distribution plate comprising a plurality of gas injection orifices (Fig. 1 Item 350), the gas distribution plate being coupled to a temperature controlled gas distribution system for introducing a process gas into the chemical treatment chamber (Fig. 1 Item 140). The protective barrier on the interior surface of the chemical treatment chamber comprises at least one of Al_2O_3, Y_2O_3, Sc_2O_3, Sc_2F_3, YF_3, La_2O_3, CeO_2, Eu_2O_3, and DyO_3 (Paragraph 80 Lines 1-4).

Carducci does not disclose the thermal insulation assembly comprises a protective barrier layer comprising one of Y_2O_3, Sc_2O_3, Sc_2F_3, YF_3, La_2O_3, CeO_2, Eu_2O_3, and DyO_3 on at least one exposed surface.

Imafuku teaches the thermal insulation assembly comprises a protective barrier on at least one exposed surface for the purpose of preventing damage attributable to plasma on exposed surfaces and the extent of metal contamination and dust generation is lowered (Abstract and Paragraph 27, Lines 1-6). Okase, Lingampalli, and Imafuku are

analogous art because they are from the same field of endeavor, namely semiconductor processing apparatus.

Although Imafuku does not disclose the provision of a protective barrier layer on all of the surfaces of the apparatus exposed to plasma, it would have been obvious to one of ordinary skill in the art to do so with expectation of achieving the same results described in Imafuku.

At the time of invention, it would have been obvious to a person of ordinary skill in the art to form the apparatus of Okase in view of Lingampalli including a thermal insulation assembly comprises a protective barrier on at least one exposed surface. The suggestion or motivation for doing so would have been to provide a stable condition maintainable even when it is exposed to plasma and to prevent damage attributable to plasma on exposed surfaces and to lower the extent of metal contamination and dust generation (Abstract and Paragraph 27, Lines 6-7). Therefore, it would have been obvious to combine Okase in view of Lingampalli with Imafuku for the benefit of having a thermal insulation assembly comprising a protective barrier on at least one exposed surface to obtain the invention specified in Claim 2.

With respect to Claim 36: Carducci discloses chemical treatment system of claim 31, wherein the substrate holder has a protective barrier formed on at least a portion of an exposed surface (Paragraph 59 Lines 1-6).

With respect to Claim 37: Carducci discloses a chemical treatment system of claim 31, wherein a protective barrier is formed on at least a portion of an exposed

surface of the gas distribution plate and on at least a portion of an exposed surface of each orifice (Paragraph 80 Lines 1-4).

With respect to Claim 38: Carducci discloses a thermal treatment system for thermally treating the chemically altered surface layers on the substrate (Fig. 1 Item 112), the thermal treatment system comprising: a temperature controlled thermal treatment chamber having a protective barrier formed on at least a portion of an interior surface (Fig. 1 Item 121); a temperature controlled substrate holder mounted within the thermal treatment chamber (Fig. 1 Item 124); a vacuum pumping system coupled to the thermal treatment chamber (Fig. 1 Item 109); and a temperature controlled upper assembly coupled to the thermal treatment chamber (Fig. 1 Item 140). The protective barrier on the interior surface of the thermal treatment chamber comprises at least one of Al_2O_3, Y_2O_3, Sc_2O_3, Sc_2F_3, YF_3, La_2O_3, CeO_2, Eu_2O_3, and DyO_3 (Paragraph 80 Lines 1-4).

With respect to Claim 43: Carducci discloses a thermal treatment system as claimed in claim 38, wherein the substrate holder has a protective barrier formed on at least one exposed surface (Paragraph 59 Lines 1-6).

Response to Arguments

Applicant's arguments filed 4 December 2006 have been fully considered but they are not persuasive.

Imafuku et al. teaches the use of a protective barrier layer as claimed as well as motivation for providing the protective barrier layer, as described above.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Karla Moore whose telephone number is 571.272.1440. The examiner can normally be reached on Monday-Friday, 9:00 am-6:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on 571.272.1435. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Karla Moore
Patent Examiner
Art Unit 1763
11 June 2007